REMARKS

The claims of this application are directed to a gas directing system and method.

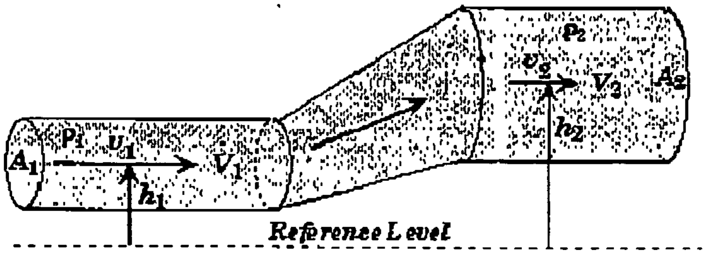
Claim Rejections – 35 USC § 101

Claims 1, 2, 4-6, 8, 9, 11-19, 22, 23, 25-27, 29, 30, 32-40 and 43 are rejected under 35 USC §101 on the grounds that the claimed invention lacks patentable utility. More specifically, the Examiner does not believe that the dual-pathway configuration will significantly increase the velocity of the fluid given that there is additional frictional drag on the fluid due to the presence of the interior pathway. Applicant respectfully disagrees with the examiner and below explains the physics behind the claimed invention that is responsible for the increased fluid velocity and the resulting performance enhancement. As requested by the examiner, Applicant is providing the equations that support the claims and these equations are well known.

The invention utilizes basic fluid dynamics to increase gas (air) velocity and volume flowing through a tube. The invention includes a standard-sized outer tube (i.e., the second pathway 46 shown in FIG. 3D) and an inner tube (i.e., the first pathway 44 shown in FIG. 3D) having a smaller diameter than the outer tube. As shown in FIG. 3D, gas can flow through the path between the two tubes (herein referred to as the "inter-tubal area") and through the inner tube.

The examiner has asserted that the law of conservation of momentum requires that the net momentum of gas after entrainment must be the same as the combination of the slower and faster flows and therefore there will be no overall increase in flow. The examiner is correct that the overall momentum must be conserved. For a incompressible fluid flow (e.g., air) that is laminar and steady state, the well known Bernoulli's equation, which is a statement of the conservation of energy per unit volume along the pipe, tells us:

$$P_1 + \frac{1}{2}\rho_1 v_1^2 + \rho_1 g h_1 = P_2 + \frac{1}{2}\rho_2 v_2^2 + \rho_2 g h_2$$



For the air directing mechanism, the fluid is the same so that the density ρ1 is the same as ρ2 and the duct heights are the same (h1 = h2) so that the above equation is reduced to:

$$P_1 + \frac{1}{2}(\rho_1)V_1^2 = P_2 + \frac{1}{2}(\rho_2)V_2^2$$

The well known equation of continuity (derived from Bernoulli's principle) tells us that, for a fluid flow through a pipe, $\rho A V = constant$ wherein A is the cross-sectional area and V is the flow velocity which reduces to AV= constant. Thus, $A_1V_1 = A_2V_2$ wherein A_1 is a cross sectional area of a first portion of a pipe, V_1 is the velocity of the fluid in the first portion of the pipe, A_2 is the cross sectional area of a second portion of the pipe and V_2 is the velocity of the fluid at the second portion of the pipe so that the mass flow at each portion is the same. When the pipe has the same cross section along the entire length of the pipe, the velocity is constant. However, when the pipe has a constriction in it and the cross sectional area decreases ($A_2 < A_1$), the velocity at that point increases ($v_2 > v_1$). If the velocity of the fluid at the constriction point increases, then the pressure of the fluid at that point decreases due to Bernoulli's principle set forth above.

For example, if the first portion of the pipe has a 1 inch radius ($A = pi * r^2$) and the second portion of the pipe has a 1.5 inch radius, the velocity at the first portion of the pipe is 2.25 times faster than the second portion and the pressure at the second portion is higher than the pressure at the first portion. This effect is the well known Venturi Effect when the increase in air velocity results in the reduced pressure and produces a partial vacuum at that point. This, concept is disclosed in the present application at paragraph 0026 of the published patent application.

Thus, as is well known, the partial vacuum will cause a scavenging effect to occur in which exhaust gases, from the engine to which the gas directing mechanism is attached, are pulled out of the combustion chamber during the exhaust cycle which increases the horsepower of the engine to which the gas directing mechanism is attached as recited in the independent claims. Therefore, the rejection of the claims should be withdrawn.

CONCLUSION

Based on the foregoing, Claims 1, 2, 4-6, 8, 9, 11-19, 22, 23, 25-27, 29, 30, 32-40, and 43 are in condition for allowance.

The Examiner is invited to call Applicant's attorney at the number below in order to speed the prosecution of this application.

The Commissioner is authorized to charge any deficiencies in fees and credit any overpayment of fees to Deposit Account **No. 07-1896** referring to Attorney Docket 355685-991100.

Respectfully submitted,

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